

EXHIBIT B

IN THE UNITED STATES DISTRICT COURT

**FOR THE NORTHERN DISTRICT
OF CALIFORNIA**

**ANIBAL RODRIGUEZ, SAL CATALDO,
JULIAN SANTIAGO, and SUSAN LYNN
HARVEY, individually and on behalf of
all other similarly situated,**

Plaintiffs,

V.

GOOGLE LLC,

Defendant.

Case No. 3:20-cv-04688-RS

EXPERT REPORT OF JONATHAN E. HOCHMAN

March 22, 2023

Table of Contents

I. INTRODUCTION.....	4
II. STATEMENT OF LIMITATIONS	7
III. ENGAGEMENT	7
IV. EXPERTISE.....	8
V. PREPARATION	12
VI. BACKGROUND	13
A. Google Accounts	14
B. Web & App Activity (WAA) and supplemental Web & App Activity (sWAA)	16
C. Firebase	26
D. AdMob SDKs.....	31
E. Mobile Apps and Webviews	34
VII. OPINIONS	37
A. Google Has Collected WAA-off and sWAA-off Data Throughout the Class Period.....	37
1. Google Analytics for Firebase.....	38
2. Google’s App Advertising Products.....	54
3. Google Firebase Cloud Messaging.....	64
B. Google Has Saved WAA-off and sWAA-off Data Throughout the Class Period.	65
1. Google’s Data Storage Overview	66
2. Google’s Storage of WAA-off and sWAA-off GA4F Data	75
3. Google’s Storage of WAA-off and sWAA-off App Ads Data	95
C. Google Does Not Provide Users with Control Over Google’s Collection and Saving of WAA-off and sWAA-Off Data.....	115
D. Google Does Not Provide a Way for Users to Delete WAA-off and sWAA-off Data. ...	115
E. App Developers Have No Way to Prevent Google from Collecting or Saving WAA-off and sWAA-off Data.....	118
F. Google Throughout the Class Period Used and Monetized WAA-off and sWAA-off Data, Including for Purposes of Serving ads, Tracking Conversions, and Improving Google Products.....	120
1. Serving Advertisements While WAA or sWAA is Turned off.....	121
2. Attribution/Conversion Tracking	124
3. Improving Google Products, Processes and Services.....	130

G. WAA-off and sWAA-off Data is Linked to Users..... 132

H. California: Google Designed its Systems to Provide its California-Based Employees with Access to WAA-off and sWAA-off Data Collected Nationwide, and Google Employees Routinely Access that Information in California. 145

I. Class Member Identification: Google Has Collected and Saved WAA-off and sWAA-off Data in Ways that Identify Class Members, Though Google also Withheld and Destroyed Data Relevant to that Identification..... 147

J. WAA Functionality: Throughout the Class Period, WAA and sWAA Functioned in Ways that Were Different than Google Represented. 155

1. The WAA Switch 155

2. The WAA Help Page 157

3. Android Screens 163

4. “My Activity” 165

K. WAA Changes: Google Could Change WAA and sWAA to Ensure They Function as Described. Google Could Also Purge its Systems of WAA-off and sWAA-off Data. ... 168

7. There is a better way. Google could change its processes so that switching off the WAA and sWAA toggles actually prevents Google from collecting and saving app activity data, as Google represented to users. Google could also purge its systems of WAA/sWAA-off data already collected, and delete any products, services, or algorithms built in whole or in part with WAA/sWAA-off data.

II. STATEMENT OF LIMITATIONS

8. This report has been prepared for purposes of this case only. It may not be used for any other purpose. This report contains and refers to information designated as “CONFIDENTIAL” and “HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY” under the Protective Order entered in this case, including information designated by both Plaintiffs and by Google.

III. ENGAGEMENT

9. Counsel for the Plaintiffs in this action (“Counsel”) retained me to develop and render opinions concerning the technology and practices at issue in this litigation with respect to products developed and distributed by defendant Google, LLC (“Google”), based on my analysis and review of documents, testimony, written discovery, data produced,¹³ and the testing described in this report. Specifically, I am focusing on Google tracking and advertising code through which Google collects mobile app activity during users’ interactions with non-Google branded mobile apps. I am informed that the tracking and advertising code at issue in this case includes the Firebase SDK and Google Mobile Ads SDK, which supports AdMob, AdMob+, and Ad Manager. I am also focusing

¹³ All documents considered appear in the attached Exhibit A.

on the WAA and sWAA settings that Google offers to accountholders. My report includes various appendices and exhibits, served with this main report.

10. I am being compensated for my work in this case at the rate of \$800 per hour, which was my standard hourly rate as of the date of my engagement. My business partner, Julie Ann Burns, is charging \$200 per hour, which was her standard hourly rate as of the date of her engagement. Our compensation does not depend upon the outcome of the case. I understand that, should there be any recovery in this case, Ms. Burns and I will be excluded from any disbursement of funds.

11. While I have used Firebase and the WAA activity control panel during the class period, before this engagement, I was not aware of Google's collection, storage, and use of WAA-off data. I only became aware through discovery in this case.

12. To the extent any other documents or data are produced or there is any further testimony or discovery, I reserve the right to supplement this report.

IV. EXPERTISE

13. I have a Bachelor of Science (BSc.) degree awarded *summa cum laude* and Master of Science (MSc.) degree in computer science, both from Yale University. I earned my degrees in 1990, one of four students in my class of 1500 to receive simultaneous degrees. My master's thesis, entitled *How to Create a Failure Tolerant Distributed System*, focused on distributed transaction processing and the distributed consensus problem. My coursework at Yale included theory of computation, distributed systems, artificial intelligence, systems programming, and operating systems. My thesis advisor was Dr. Michael J. Fischer, a renowned computer science professor known for his work in distributed computing. I was encouraged to attend Yale by, and then studied with, Dr. Alan Perlis, the first recipient of the Turing Award, the "Nobel Prize of computing."

. . . Sites and apps that use Google services, including data that apps share with Google.” These statements are also technically true but incomplete. They omit to point out that Google collects and saves this information regardless of whether WAA or sWAA have been turned off.

379. Finally, Google represents that “To let Google save this information,” both WAA and sWAA must be on. That statement is inaccurate as a technical matter. Google is saving this information even if the user has turned off WAA and/or sWAA.

380. I understand that these disclosures within the WAA Help Page have not materially changed throughout the Class Period (Google’s 2nd Supp. Resp. to Interrog. Nos. 6-8).

381. Google employees have (correctly in my view) commented on why Google’s WAA disclosures are inaccurate. For example, Google employee Chris Ruemmler wrote in a July 2019 email that this WAA Help Page “actually doesn’t describe what happens when [WAA] is disabled” (GOOG-RDGZ-00024709 at -710). Mr. Ruemmler pasted into his email portions of the WAA Help Page that I pasted just above, and he explained that “[w]hen Web & App Activity is OFF, I’d expect the opposite to happen.” “[G]iven the way on/off works, one has to then assume that *disabled (off) would be the exact opposite* of what is described for what happens when the WAA bit is on” (*Id.*) Mr. Ruemmler accordingly recommended that the WAA Help Page be revised because “[t]he WAA and other controls imply we don’t log the data, but obviously we do,” which gives users “a false sense of security that their data is not being stored at Google, when in fact it is” (*Id.* at -709-710). “We need to change the description to indicate even with the control off, Google retains this data and uses it for X purposes” and to “indicate that WAA-off is identical to being not logged into your account (data logged, but not tied to your account)” (*Id.* at -710-711). This sentiment was echoed by Googler JK Kearns in an email stating that “to me, it feels like a

fairly significant bug that a user can choose to turn off WAA but then we still collect and use the data (even locally)” (GOOG-RDGZ-00044478 at -482).

382. Mr. Ruemmler raised similar complaints over the ensuing months and years. In December 2019, Mr. Ruemmler wrote: “Isn’t WAA- off supposed to NOT log at all? At least that is what is implied from the WAA [Help] page . . . So, if WAA is off, how are we [Google] able to log at all?” (GOOG-RDGZ-00130381 at -381). And in July 2020, the same month this lawsuit was filed, Mr. Ruemmler wrote: “Web and App Activity is the worst name ever. This is part of the problem with the WAA bit. What does it ACTUALLY control? It is not obvious at all from our documentation. We need to be very clear about what is controlled by this flag” (GOOG-RDGZ-00089546 at -546). Two years later, Mr. Ruemmler stated that Web & App Activity is “not a great name, but like it could be improved” (Ruemmler Tr. 157:10-11).

383. Mr. Ruemmler explained during his deposition that his questions about WAA and the relevant disclosures arose “back before I had more knowledge about the way WAA works.” He believed at the time that “if the opposite of on and off, if it was off, well, we just didn’t, you know, send any of this data to Google. But that’s not right” (Ruemmler Tr. 72:22-73:1). Mr. Ruemmler likewise testified: “A light is on, a light is off; right? You know, that’s the opposite behavior. And so I think I had a misconception that when WAA was off, there was no logging performed” (Ruemmler Tr. 135:20-25); *see also* Ruemmler Tr. 149:3-7 (Mr. Ruemmler testifying that “I believe this is going back to my misconception that WAA off meant no storing of information to Google.”).

384. Mr. Ruemmler also conceded that his confusion persisted for over a year. Reviewing multiple emails that he sent over time, Mr. Ruemmler explained that “apparently... didn’t know everything it controls because I’m asking the question again” (Ruemmler Tr. 149:22-25; 155:16).

385. I agree with Mr. Ruemmler. To accurately describe the functions of WAA and sWAA, Google must explain that Google collects and saves the same data notwithstanding whether WAA and/or sWAA are off. The only import of switching off these toggles impacts how the data is stored—that is, whether the data is explicitly associated with a user’s GAIA ID.

386. Other Google employees have (correctly in my view) expressed similar criticism of Google’s WAA disclosures throughout the Class Period. For example, in June 2016, Google employee Jonathan McPhie wrote that “Our definition of ‘collect’ is more like ‘stored’ . . . From that perspective, sWAA . . . is more about moving data around and not about ‘collecting’ more data” (GOOG-RDGZ-00149701 at -701). I agree with Mr. McPhie that sWAA “is more about moving data around and not about ‘collecting’ more data.” Google collects and saves data relating to users’ interactions with non-Google apps that use Google services regardless of whether sWAA is on or off. sWAA merely “mov[es] data around”—that is, impacts whether the data is stored in a personal log where it is expressly associated with the user’s GAIA ID, as opposed to a non-GAIA log. But in the words of another Google employee, Google is “intentionally vague” about data “collected outside of their Google Account” because “the technical details are complex and it could sound alarming to users” (*Id.* at -702).

387. Relatedly, in November 2018, Google employee JK Kearns wrote “I think teams should not use user data at all if WAA is off” (GOOG-RDGZ-00039094 at -094).

388. In August 2020, weeks after this lawsuit was filed, Google employee Elyse Bellamy asked a colleague whether it was “worth calling out that many people don’t feel they have genuine choice? IMO the two problems we face because WAA is so broad are (A) people can’t get their heads around what it collects / uses because the scope is - vast and vague” and B) the all-or-nothing nature / lack of a granular controls means people don’t feel they have genuine choice if they want

to use Google” (GOOG-RDGZ-00203545 at -546). Another internal Google document related to Google’s PrivacyNative Project admitted that “much of the [WAA] language intended to be comprehensive feels vague and hard-to-parse for non-engineers / lawyers, and our examples are not universally resonant” (GOOG-RDGZ-00203679 at -680).

389. Internal Google research studies justify these employees’ concerns. An April 2017 internal Google study found that the “effect of the activation of the Web & App Activity is not well understood” (GOOG-RDGZ-00020692 at -706). Another seemingly 2017 study (based on the document’s metadata) summarized how “8/10 [participants] didn’t understand the sWAA text and the effect this could have in their experience” and the presentation described WAA and sWAA as “losers” (GOOG-RDGZ-00144760 at -766). A March 2019 deck titled “Data Retention Usability Study Findings,” discussed “persistent points of confusion,” including “uncertainty about what type of data is impacted by controls” including WAA (GOOG-RDGZ-00021160 at -182). Similarly, Google user experience research employee Arne de Booi concluded based on yet another study that “WAA settings are hard to understand” (GOOG-RDGZ-00151484 – KeyInsights tab at row 38).

390. The results of an April 2020 study (just months before this lawsuit was filed) are particularly noteworthy. “All participants expected turning WAA toggle off to stop saving their activity” and “All participants expected turning off toggle to stop their activity from being saved” (GOOG-RDGZ-00151992 at -000, -011).

391. That result is not surprising to me because that is exactly how Google described the WAA functionality.

392. Even Google employees with expertise on the Google products at issue in this case have admitted that they do not understand how WAA and sWAA affect Google’s collection of the data

at issue. For example, Google employee Francis Ma, who has been involved with Firebase since 2015, including with responsibility for “product management aspects” of Firebase (Ma Tr. 30:13-16, 36:9-37:1) testified that:

- he does not know if Google saves any data while WAA is turned off (Ma Tr. 62:4-13)
- he has only a “vague understanding” of what WAA is, and is generally not familiar with WAA (Ma Tr. 126:17-19; 127:1-4; 136:16-18)
- he has no idea what SWAA is (Ma Tr. 55:21-56:3; 58:16-24; 119:11-15)

393. Similarly, when asked to describe his understanding of “what the WAA control does,” former AdMob product manager Ed Weng testified that “I would have to speculate” and admitted that “I don’t know the details behind it” (Weng Tr. 21:17-24). When asked “does AdMob collect data from users who have WAA and sWAA-off,” Mr. Weng responded: “That I don’t know.” (Weng Tr. 143:6-8).

394. Similarly, WAA product manager David Monsees has been an employee at Google for over a decade and has assisted with crafting the WAA disclosures but could not provide a yes or no answer when asked if sWAA-off data is stored by Google (Monsees Tr. 287:19-290:11).

3. Android Screens

395. The same WAA disclosures I discuss in the immediately preceding subsections (within the “Activity controls” webpage and the WAA Help Page, are made available to users through the “Settings” menu of a mobile device running Android OS. Users can navigate here to switch off WAA and/or sWAA, where they are informed by Google: